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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/569,781	02/24/2006	Thomas Matschullat	2003P11654WOUS	6080
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EXAMINER				
LIN, KUANG Y				
ART UNIT		PAPER NUMBER		
1793				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary**Application No.**

10/569,781

Applicant(s)

MATSCHULL ET AL.

Examiner

Kuang Y. Lin

Art Unit

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 June 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 39-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 39-44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SI/02)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 39 and 40 are rejected under 35 U.S.C. 102(b) as being anticipated by US 6,383,310 to Otsuka et al. as evidenced by US 4,919,711 to Banyai et al.

Otsuka et al. discloses the production of exhaust equipment members using a melt of heat-resistant, high-Cr, high-Ni, austenitic steel which is then cast to form the members. At col. 8, lines 20-22, Otsuka et al. discloses that as the weight ratio of Ni to Cr increases, the austenitic cast steel exhibits higher oxidation resistance and high temperature strength and that such an effect is saturated when the weight ratio of Cr/Ni reach 1.0. This determination that Otsuka et al. has done constitutes "establishing a first range of relative concentration limits for at least two elements of a melt such that a subsequent casting of the melt will exhibit acceptable mechanical properties". More specifically, Otsuka et al. has established that a range of greater than 1.0 for the relative concentration of Cr to Ni in a steel melt will produce a subsequent casting that exhibits acceptable oxidation resistance and high temperature strength (acceptable mechanical properties). At col. 8, lines 23-28, Otsuka et al. discloses that when the weight ratio of Cr/Ni exceeds 1.5, secondary Cr carbides are excessively precipitated together with brittle precipitates such as an alpha phase, resulting in extreme brittleness. This determination of Otsuka et al. constitutes "establishing a second

range of relative concentration limits for the at least two elements of the melt as subset of the first range of relative concentration limits such that the melt is castable". More specifically, Otsuka et al. has established the second range of 1.0-1.5 for the relative concentration of Cr to Ni in the steel melt. This second range is clearly a subset of the first range of greater than 1.0 and is established so that extreme brittleness does not result which makes the melt castable. Note, it is known that castability and brittleness go hand in hand. See Banyai et al at col. 4, lines 63-68, which provides evidence that limiting the brittleness as in Otsuka et al. is also increasing the castability, thus meeting the limitation of claim 39. After establishing this subset range of 1.0-1.5 for Cr/Ni, Otsuka et al. makes the melt to correspond with this ratio and thus carries out the recited step for "controlling chemistry of the melt to within the second range of relative concentration limits". In other words, to make sure the resulting melt and casting have a Cr/Ni ratio within the range of 1.0-1.5, the chemistry of the melt must have been controlled in some manner, which would meet the claim limitation. This entire process would certainly constitute a "method for controlling the castability of liquid steel" as set forth in the preamble of claim 39. With respect to claim 40, at col. 6, line 50 through col. 7, line 30, Otsuka et al. also establish the preferred ranges (the second range) of carbon, silicon, magnesium, and sulfur.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 41-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,383,310 to Otsuka et al.

Since Otsuka et al. also establish the preferred ranges (the second range) of C, Si, Mn, and S, to establish the preferred ranges (the second range) for Mn/S, Si/C or S/C is deemed to be nothing more than an obvious matter of design choice. With respect to claim 43, it is conventional to use computer and monitor to monitor and control a manufacturing process, such as a casting process.

6. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teaching of US 6,383,310 to Otsuka et al. and applicant's admitted prior art as set forth in pages 1-2 of the specification.

Otsuka et al. show to conditioning the melt through two steps, to refine the optimal composition range for obtaining a castable melt. The admitted prior art teaches that it is conventional to condition by addition of alloying elements and

additives the steel melt through the use of mathematical models and the strength formulae to obtain a castable melt for a strip casting process, but it does not teach to simply establish a first range and a second range during the conditioning process. In view of the prior art teaching as a whole, it would have been obvious to use the simple technique of Otsuka et al. to facilitate the melt conditioning process such that to obtain a castable melt in the twin-roller casting process of the admitted prior art. It would also have been obvious that the technique of Otsuka et al. can be adapted in any casting process, including a twin-roller casting process of the admitted prior art, to facilitate that process.

7. Applicant's arguments filed June 24, 2008 have been fully considered but they are not persuasive.

a. Applicant in page 5 of the response stated that the brittleness and castability do not go hand in hand and cited a publication by Makhoul et al. to show that the castability of an alloy is taken to refer to those properties of the alloy that characterize its behavior in the casting process. Applicant further stated that brittleness is not a property that would affect an alloy's behaviour in the casting process because brittleness is a mechanical property of the alloy that may be examined after casting has taken place. However, in [0002] of the instant specification it states that the invention relates to a method for predicting and controlling the castability of liquid steel ----- for obtaining specific **material property** of the steel. Further, in [0004] it states that the material properties include strength, toughness, hardness, corrosion resistance etc. In [0006] it

further states that liquid steel is designated as uncastable if the cast strip shows cracks, exhibits surface defects or structural faults. It is a common knowledge that strength, toughness and hardness of a cast product refer to the mechanical properties thereof and problems of cracks, surface defects and structural faults in a cast product are related to mechanical property thereof. Thus, the castability of an alloy is also taken to refer to mechanical properties of the alloy, i.e. the alloy would be designated as uncastable if the cast product of the alloy would not have a designated mechanical property.

b. Banyai et al. states that phosphorus has adverse effects on the castability, i.e. increased brittleness and reduced strength. The brittleness and strength relate are mechanical property of a casting. When the brittleness of a cast product were predicted to be beyond a designated range, the melt were designated as uncastable and vice versa. Thus, it is a further evidence that the castability of an alloy is also taken to refer to mechanical properties of the alloy. Thus, examiner's statement that "castability and brittleness go hand in hand" is corrected.

c. Applicant in page 6 of the response stated that the second range considered by the examiner is not a subset of the first range. However, Otsuka et al. states that "as a weight ratio of Ni to Cr **increase**, the austenitic cast steel exhibits higher oxidation resistance and high temperature strength. Such effects, however, are saturated when the weight ratio of Cr/Ni **reaches 1.0**. On the other hand, when the weight ratio of Cr/Ni **exceeds 1.5**, secondary Cr carbides are

excessively precipitated together with brittle precipitates such as an alpha-phase, resulting in extreme brittleness. Therefore, the weight ratio of Cr/Ni is **preferably 1.0-1.5.**" Thus, the first range of the weight ratio of Cr/Ni in Otsuka et al. is from below 1.0 to above 1.5 and second range is 1.0-1.5.

d. Applicant in page 7 of the response stated that nothing in Otsuka et al. recognizes the criticality of the claimed five pairs of alloying elements in amended claim 42. However, it is noted that in col. 6, line 50 through col. 8, lines 15 of Otsuka et al. they recites a wider range (first range) and a preferred range (second range) for each element. Thus, a pair of any two elements also has a first range and a second range. When a liquid steel to be cast, which comprises elements, such as Si, O₂, S, Si, Al, C, N, etc., it would have been obvious to also define a first range and a second range for each pair of elements.

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kuang Y. Lin whose telephone number is 571-272-1179. The examiner can normally be reached on Monday-Friday, 10:00-6:30,.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica L. Ward can be reached on 571-272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kuang Y. Lin/
Primary Examiner, Art Unit 1793

7-25-08